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THE

MINERAL COLLECTOR

DEVOTED TO THE INTERESTS OF THE

COLLECTOR, STUDENT AND DEALER.

ARTHUR CHAMBERLAIN, Editor.

Member of the New York Mineralogical Club and of the Brooklyn Institute of Arts and Sciences.

VOL. III, NO. 3—MAY, 1896.

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PUBLISHED BY
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26 JOHN ST., NEW YORK.

FOR SALE.

— A —

Private Collection of Rare and Choice

MINERALS.

The mineral collection of W. M. Foote, including the following rarities secured at European and American localities has recently been placed on sale with us. The specimens are mostly of moderate price, being originally retained more on account of their attractive appearance, neat shape and perfect crystallization than for commercial value. In many cases they represent "first pick" in this respect, from large lots, and the present breaking of the collection is an opportunity for collectors that has already been taken advantage of by several of our patrons.

We are not offering the collection at "bargain prices," but at a fair and reasonable approximation of the value of the specimens which will be sold separately. Sent on approval to responsible parties.

DR. A. E. FOOTE,

WARREN M. FOOTE, Manager.

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Wulfenite and Pyromorphite, Phœnixville, Pa., 3x1¾ in., $1.50.
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Bismuthenite, Cornwall, England, 4x2½ in., $3.50.
Domeykite var. Condurrite, Cornwall, England, 2 oz., $2.50.
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Cassiterite, Grinwald, Bohemia, 2x1½ in., $2.50.
Sphalerite, black, Kapnik, Hungary, very brilliant crystal with Pyrite, 2x2 in., $2.50.
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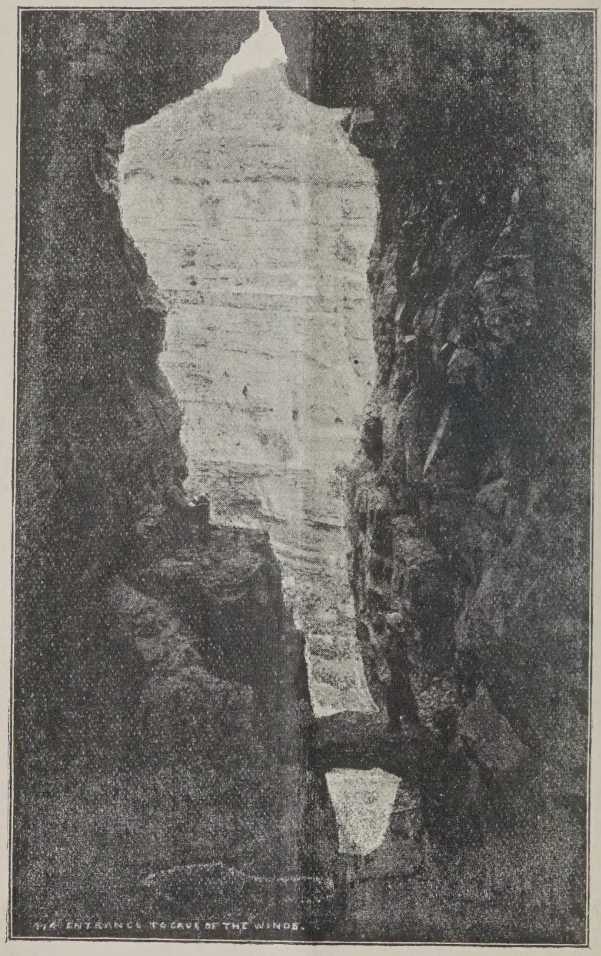
Isolated Crystals of :—Bournonite $1.50; Alexandrite, $2.00; Boracite, $1.25; Vanadinite, $1.00; Wulfenite, $2.50; Titanite, $1.25; Epidote, $3.00; Gypsum, $1.00; Gadolinite, $1.50; Matlockite, $5.00; Orthoclase, $1.50; Apatite, 75c.; Aragonite, 50c.; Zircon twin, $5.00.



ENTRANCE TO CAVE OF THE WINDS.

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THE

MINERAL COLLECTOR.

[Entered as Second-Class Matter at the New York, N. Y., Post Office, March 19, 1894.]

VOL. III. MAY, 1896. NO. 3.

CAVE OF THE WINDS.

BY GEO. A. STABLER.

THIS wonderful cave is situated ten miles from Hot Springs, in the Black Hills of South Dakota, and was discovered by a cowboy in 1880 by the roar of an out-rushing current of wind, from which it takes its name. Nothing was done in the way of improvement until 1890, since then explorations have been made until ninety miles of passages and three thousand rooms have been found, and twelve thousand dollars have been expended on inside improvements, making this the finest and largest cave in the known world.

Although this cave is new and not extensively advertised, it is attracting the attention of the general public, and is pronounced by all who see it, a wonderful work of nature.

There are eight different levels or tiers of chambers overlying each other, as an eight story house. Each level is of different formation. At present there are fourteen routes, but only two, Sampson's Palace or the short route, and Castle Garden or the long route, are opened to the public.

Wind Cave is in the limestone formation, but strange to say only a few stalactites or stalagmites have been found, owing no doubt to the extreme dry climate of this country.

Calcite and quartz geodes, coral, fossils, a stalagmite formation resembling popcorn, a calcite formation called boxwork on account of its resemblence to little boxes or pigeon holes in a desk, are found, and a beautiful, delicate, white and pink formation, which outrivals any of Jack Frost's wonderful work. Eminent geologists say that the last two formations are only found in Wind Cave.

After a beautiful drive of ten miles north of Hot Springs in a fine four horse tally-ho coach one arrives at the cave, and after a good dinner at the Wind Cave Hotel, every thing is in readiness to make a trip into the cave.

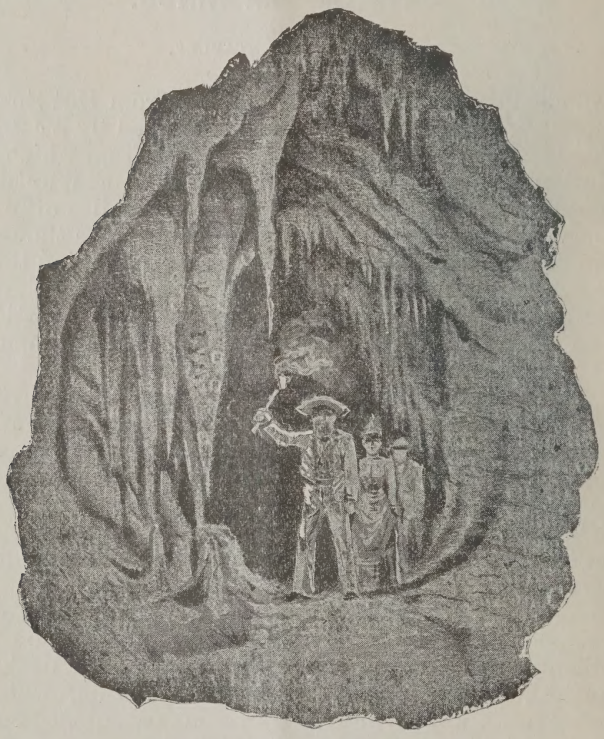
Descending one hundred and fifty-five feet on easy stairs we arrive in the first room, the Bride's Chamber. This room is not large, but was so named by a romantic couple being married there some years ago.

We then pass Lincoln's Fireplace, Prairie Dog Town, Snow-ball Room, Church Steeple, and into the Post Office. This room is one-half mile from the entrance, and was so named by the perfect box work on the ceiling resembling post-office boxes. The room is about two hundred feet long by sixty feet wide with a dome about eighty

feet high. From here we go into Red Hall, so named on account of the walls being of a red formation. The room is larger than the Post Office, and of a more regular appearance.

The next is White Room, then Grand Opera, Devil's Lookout, Milton's Study, Sampson's Palace, Swiss Scenery, Queen's Drawing Room, and the Methodist Church, which is one mile from the entrance. From here we go into the Giant's Causeway, Lena's Arbor and Capitol Hall.

This is the largest room on the short route, containing about three



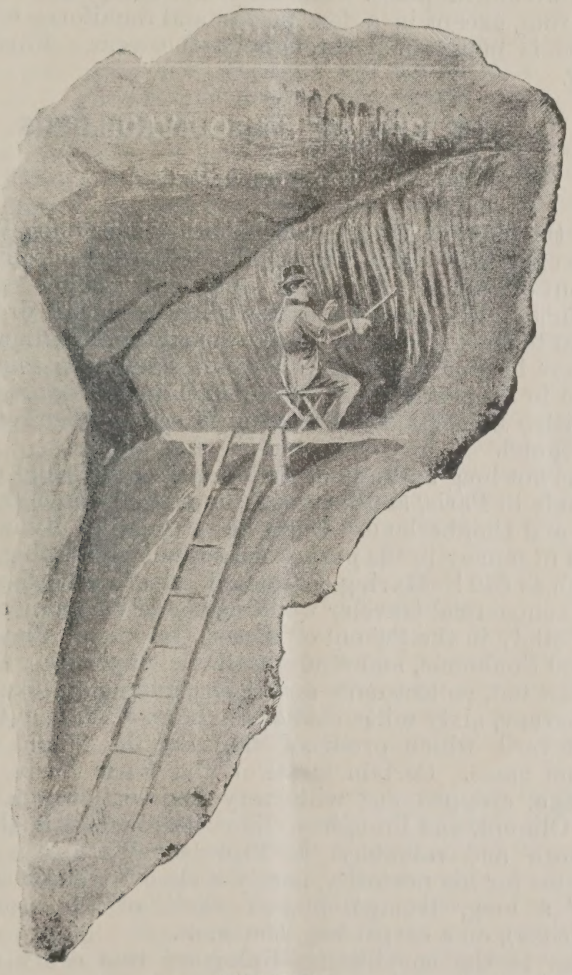
BRIDE'S CHAMBER

quarters of an acre with a very rough, picturesque appearance. The ceiling being from forty to fifty feet high. A number of Rochester lamps are suspended from the ceiling of this room, and the effect is wonderful, giving one a small idea of how electric lights will bring out the scenery.

The next room is the Amphitheatre, then Turtle Pass with the monster Turtle, and then the Confederate Cross Roads. This is the junction of the Sampson's Palace route, to the Garden of Eden, and the Castle Garden route to the Fair Grounds and Pearly Gates. The next room is the Stone Quarry, being as natural a stone quarry as any one could find. The stone, which is lime, lies in layers about ten inches thick, and some very fine blocks and slabs have been quarried.

Bishop's Gate is the next point of interest, being a crevice one hundred and twenty-five feet high, and lighted with one hundred candles.

Then we pass into Fallen Flats, two miles from the entrance, and three hundred and fifty feet below the surface. This is the lowest point on this route. We then ascend Cliffclimber's Delight, a climb of



CATHEDRAL

sixty feet on easy stairs, to Five Points, a place where five routes connect.

Next comes Omaha Bee Office, W. C. T. U. Hall, Silent Lake, Daily Nebraska State Journal, Cathedral, with its piano, whose keys are long clear stalactites, that give a clear mellow musical tone when struck with a pen knife.

The next room is the Garden of Eden, two and one half miles from the entrance, and the end of this route. This room contains about

one half an acre, and on all sides can be seen the beautiful white and pink frostwork. Exclamations of surprise and pleasure are heard on every hand from start to finish. A very faint idea of the rare beauties, the varied and peculiar formations, can be conveyed in language.

They must be seen to realize the extent, the grandeur, the sublimity of this wonderful place. The air is not damp, nor does water drop from the roof, except in a few places, and a uniform temperature of 45 degrees is maintained throughout the year.—*From the Oregon Naturalist.*

THE KING OF MUSEUM-BUILDERS.

PART II.

After the close of the great Egyptian picnic, young Ward resumed his studies in Paris. The only regular feature about his course was running out of money. He would study in the School of Mines and the museums until almost penniless, when he would drop his books, and hasten to the gypsum and chalk quarries of Montmartre and Meudon. There he would gather a load of good minerals and fossils, pack them in his trunk, cross the channel to London, and sell them to the British Museum, the School of Mines, or wherever else a buyer could be found.

He was not long finding out that British fossils and minerals were also saleable in Paris, and forthwith he tapped the mining regions of Cornwall and Cumberland. Often he returned to Paris with quite a large sum of money in his pocket, sometimes amounting, he slyly says, to as much as $40! Having completed a second series of sales, the scientific commercial traveler would again settle down to his eclectic course of study in the School of Mines, Garden of Plants, College de France and Sonbonne, and study until his depleted treasury obliged him to start out, collect more specimens, and again take the road.

At Epernay, sixty miles east of Paris, good Madam Cliquot had a large vineyard which produced the very fine brand of champagne bearing her name. Certain strata of the Paris Basin, of the oldest Eocene age, cropped out with very fine sections on the estate of Madame Cliquot, and brought to light certain fossils that were then little known and valuable. If Professor Ward ever sets up a new coat of arms for his posterity, surely it should contain somewhere the figure of a long, trumpet-shaped shell of the *genus Cerithium* (*C. giganteum*), on a carpet-bag, couchant.

Thanks to the conciliating diplomacy that every collector must possess to be successful, and to the generous good nature of Madame and her manager, the young American who spoke such excellent French was given a cinch on the fossils underlying a portion of that estate, and told to work his will. He hired workmen at forty cents per day, and for several summers he mined and counter-mined his concession so successfully that many score of those curious fossils (the Cerithium) now repose in British and continental museums, each having yielded a benefit to the purveyor of from $5 to $10. Nature kindly made them just small enough to pack successfully in a trunk, and also light enough to carry in a satchel when necessary.

Notwithstanding the noise it makes, Europe is a small country; and in a very short time Ward had extended his field of commercial activity over the whole of it. "I never traveled third class when I could go fourth," said the man of many trips, "but I went all over Europe, selling specimens to museums, and collecting to sell elsewhere. I went to Brussels, Hamburg, Copenhagen, Berlin and Vienna repeatedly, and finally covered Sweden, Russia and Spain. To me the stupidity of those European museum men about gathering specimens from other countries than their own, seemed really curious, and I soon found not only pleasure but profit in supplying their wants. There is a certain spice of excitement and exhilaration in finding a specimen that a certain man desires very much, and in taking it to him."

Thus was developed the germ of Ward's natural science establishment. The history of that strange and unique institution really dates back to the Paris basin, and the Cerithium quarry in the vineyard of Madame Cliquot. The making of the great Ward cabinet of minerals and its purchase for $20,000 by means of a popular subscription for the University of Rochester, is merely an important incident in the development of the idea. A still more moving cause was the appointment of young Mr. Ward, after five years' study and work abroad, to the professorship of mineralogy, geology and zoology in the University of Rochester. It was during his work there as a teacher that he found how seriously every American teacher of science was hampered and handicapped by the lack of tangible representatives of the beasts, birds and reptiles that abounded in geological times, and are now extinct. Therefore, for several years in succession, he spent his vacations in the royal museums of Europe, making plaster-of-paris moulds of their rarer and more striking fossils, from which he was afterward enabled to make perfect plaster copies of the originals for his beloved cabinet in the University of Rochester.

The outcome might easily have been foreseen by a blind man. No sooner were those wonderful casts brought forward than other institutions of learning sought copies from the same moulds, and "Ward's Casts of Celebrated Fossils" was the final result. American teachers and students, to whom the originals were inaccessible, were delighted with them.

Illustrated descriptive catalogues were issued, the largest of which we used in my *alma mater* as a text book! The casts became exceedingly popular, and were an important factor in the final upbuilding of what is now the Ward establishment. In arranging to furnish educators generally with duplicate series of his casts of fossils, Professor Ward became deeply impressed by the needs of American teachers and museums of science for more illustrative material of all kinds for object teaching. He also became acquainted with so great a number of scientific men, and his interest in supplying their wants finally became so keen that in 1869 he gave up his professorship in the University of Rochester.

Embowered in the stately elms and spreading maples that overarch College avenue, almost in the shadow of the main building of the University, there now stands a group of sixteen buildings of about twelve different sizes, each with a gilded totem at its peak to show the

place in nature of its contents. Over the wide gateway to the court yard where boxes are delivered and shipped, the lower jaws of an immense right whale form a gothic arch. As you enter, a conspicuous placard informs you, in the most business-like way in the world—

THIS IS NOT A MUSEUM,

BUT A WORKING ESTABLISHMENT,

Where all are Very Busy.

If you doubt it, glance in at the open doors as you pass along, and note how busily the different groups of workers are wrestling with half stuffed orang-utans, half-mounted buffalo skeletons, with shells and corals, minerals, rocks and fossils.

Adjoining all these buildings on the north is a spacious and well-lighted square house, in the upper right hand corner of which is "the study,"—dear to the memory of I cannot tell how many naturalists, both young and old. In the front right-hand corner of the big study, which is walled with books, barricaded with maps and eternally littered with scientific papers and pamphlets and photographs and drawings and small specimens, there sits the presiding genius of this unique world. No man is more busy than he, yet Abraham Lincoln himself was not more approachable, nor more kind toward every one desiring to see him.

Twenty-one years ago, when I was an ignorant, unattractive and bumptious college student, no sooner did I hear of this strange man than I fired a letter at him, modestly stating that I would like to have him teach me everything I most desired to know. When Professor Bessey read his kind, and even fatherly reply, he remarked with vigor, "Well, that man is no churl, that's plain." And truly he was not, as many an American naturalist can testify. It was here that G. K. Gilbert, now chief geologist of the United States geological survey, made his start in the field in which he is now distinguished; and so did the late Prof. James Orton, of Vassar college; and Frederic A. Lucas, curator of comparative anatomy at the National Museum; and Prof. Walter B. Barrows, now of the Michigan Agricultural college; Prof. F. W. Stæbner, of the Massachusetts State Normal school; Mr. Edwin E. Howell, now in Washington with an establishment of his own; Mr. Arthur B. Baker, of the National Zoological park; Mr. Charles H. Townsend, naturalist of the United States Fish Commission steamer *Albatross*, and Mr. J. W. Schollick, osteologist at the National museum. Professor Ward's two grown sons, Charles H. and Henry L. Ward, are still like a part of himself, but each fills a responsible position in the establishment as an expert, the former as the head of what is now the department of human anatomy, of which the establishment is justly proud, the latter as paleontologist.

Scores of other men have been trained here in various branches of scientific work, and have gone forth to fill positions of responsibility. The Society of American Taxidermists, which in five years' time wrought a complete revolution in taxidermic work in America, was

founded here in 1880 by Professor Ward's taxidermists, and in all its work always received from him hearty sympathy, as well as active support and cooperation. It is my firm conviction that no man living has done as much toward the promotion of the art of taxidermy as has been done by Henry A. Ward and the influences created by him. He is no taxidermist himself, and never was; but he knew how to promote the production of fine work, and he believed in quality rather than quantity.

Of all the travelers I have ever known, aye, or ever heard of, Professor Ward is the most persistent, and I may still say, unsatisfied. It is true, the needs of the establishment require that some one should be very much "on the road," not only in keeping up the supply of good, salable collections, but also in keeping in touch with the museum men of the world, and selling them collections. I, too, love to travel; but it makes me feel both tired and homesick to think of all the trips abroad he has taken. There is hardly a nook or corner in the United States that he has not been to or through, and the same is true of Europe. Egypt, Nubia, Arabia and Somaliland are merely nice winter play-grounds for him, and Zanzibar, Abyssinia, Mozambique, Zululand, Natal, Cape Colony and Griqualand, 800 miles in the interior of South Africa, have all been ransacked by him for specimens. So also with Japan, Australia, Patagonia and Brazil.

When still a beardless young man he went up the river Niger in time to tell David Livingstone all about that country in Sir Roderick Murchison's London drawing room. On the African island of Fernando Po he was put down on the sand to die comfortably of African fever, but was rescued and nursed back to life by a negro woman. But for Mrs. Showers, a washerwoman for ships, and a missionary to the heathen, there would have been no Henry A. Ward these last forty years, and no natural science establishment in Rochester.

But why do I try to enumerate the countries and places that have been visited by this traveler, when I can more easily name those he has not visited? There are certain portions of the interior of South America, and of China, Japan, Siberia and Thibet that he knows not by sight. He has never been to the Arctic regions, for he finds cold weather very disagreeable, nor to Kerguelen Island. Excepting the above localities, the world is his. "One of the greatest pleasures I find in looking back over the growth of the establishment," said he in a recent conversation, "is in thinking of the acquaintances I have made in so many parts of the world, the linking of so many kinds of men to myself, as it were. It seems as if I had actual lines out to all those countries; and in the humanitarian spirit which recognizes all mankind as one blood, it is delightful to me to recognize 'my brothers' in the people I have met all over the world, savages and all. At Berberah last winter I felt like saying to these Somali Arabs, 'How do you do? I have felt for years as if I knew you, and now I have come to see you.' One result of my roaming is that it has given me a feeling of kinship for all mankind; and to me it illuminates the world!"

Thousands of people there are, also, who know Professor Ward only by correspondence, all written by his own hand, and the cords of letters he has written since I first knew him remind me of his hand-

writing. It is peculiar, and once seen is never forgotten. It is so heavy, so run together, and so *peculiar* that it caused one of his Western correspondents to protest as follows: "If you should ever try to get up a writing school in this vicinity, I will do all I can against you. Why *will* you persist in writing with a sharp stick, when pens are so cheap?" But there is balm in Gilead, and now that Professor Ward's charming daughter Alice has attained to womanhood, she is not only the head of his small household, but still further lightens the cares of her father by acting as his secretary, and writing many of his letters on a machine.

Naturally one is curious to know the religious belief of this strange cosmopolitan, who has hobnobbed with American puritans, French infidels, Mohammedan Arabs, Chinese, Buddhists, and goodness only knows what else. While going down the Red Sea with him, bound for the great hot-bed of Mohammedan fanaticism, Jedda, I put the question.

"I am an agnostic," was the answer; "but I would like to be called a Christian agnostic. I would like to be spoken of as one possessing the high hopes and ideals of Christianity, except that mine are based on data entirely distinct from those on which Christians base theirs. In short, I say of many of the highest claims and promises of the Christian religion that I accept them as possibilities, the only difference being that while a Christian says, 'I know it to be so,' I say, 'It may be so.' I look upon the dogmas of Christianity as eminently well characterized in the Scotch verdict, 'Not proven,' and on that account the word agnostic expresses my exact standing in religious matters."

I have often wondered how Professor Ward will start on his last journey; whether it will be by accident, or sudden and violent illness in some foreign hotel or steamer; or will the point be reached when the insatiable traveler is physically unable to travel abroad, and old age compels him to end his days peacefully at home. One thing only about this causes him great concern. He is really haunted by a fear that he may chance to die so far from Buffalo that he cannot be scientifically and æsthetically cremated, and will be compelled to undergo the ignominy of interment and slow decomposition in mother earth!

At present he is looking forward to ending his years in quiet study. The establishment has recently been transformed into a stock company, with a capital of $125,000, fully paid up. Of the ten stockholders he of course is one, and also is president.

All of the stockholders live in Rochester, and the most of them put cash capital into the establishment because they held that its existence there was an honor and a benefit to the Flower City. It would be base ingratitude to fail to speak gratefully of the generous and enthusiastic financial support accorded Professor Ward's unique enterprise by his uncle, Levi A. Ward, during his lifetime.

In spite of the enormous sales that Professor Ward has made, and continues to make, there is comparatively little clear profit in the business. The expenses absolutely necessary to its existence are, in the aggregate, very heavy, and somehow manage to absorb what should be handsome profits. The secret of this may perhaps best be ex-

plained by quoting from one of the late yearly reports of the National Museum at Washington. In speaking of the advance made by American institutions in natural science equipments, Dr. Goode says: "In this connection should be mentioned the very important influence of Professor Henry A. Ward, who in the conduct of his Natural History Establishment at Rochester, was always evidently actuated quite as much by a love for natural history and the ambition to supply good material to museums, as by the hope of profit, which was always by him subordinated to higher ideals in a manner not very usual in commercial establishments."

Personally, Professor Ward is by no means a rich man, save in education, observation and acquaintance with man and nature all over the habitable globe. Of riches which cannot be stolen or lost, he is indeed "well seized;" and are they not full compensation for the lack of millions of unresponsive dollars that some millionaires possess without the intelligence or the heart to make them yield the highest joy? I think so.

For the Mineral Collector.

A TRIP TO THE OLD JORDAN AND GALENA MINES, BINGHAM, UTAH.

By Maynard Bixby.

To my mind the greatest enjoyment in collecting minerals is that experienced in going to the localities and getting them, and I am indebted to Mr. A. F. Holden, manager of the famous Old Jordan and Galena Mines, for a most interesting trip.

Bingham is about 25 miles southwest from Salt Lake City, in the Oquirrali Range, and the Rio Grande Railroad lands one well up in the cañon, in which the town lies surrounded by high hills dotted over with mine dumps in all directions. The Old Jordan and Galena Mines lie in Highland Gulch, two or three miles up in the hills from the town, and connected with the railroad by a tramway and wagon roads. The property is a very large one, being nearly a mile wide and one and one-half miles in length, the great Jordan vein running through it being about 200 feet wide, beside two or three other large veins. The mine has been worked for thirty years or more, and though not 75 feet deep in its lowest workings, it contains a labyrinth of drifts, shafts and winzes, now aggregating about eleven miles. The Company's force of miners, together with the leasers, produce at present about 250 tons of ore per day, consisting principally of galena and pyrite, carrying gold and silver, with some copper and zinc. About 200 tons of this goes into the concentrating mill, while the crude ore of better grade goes direct to the valley smelters. On our arrival at the mine, we spent a short time in looking over the various minerals on hand, and after disposing of a comfortable dinner, having donned the usual overalls and rough coats, with a pocket full of candles and a miner's candlestick each, we struck into one of a number of tunnels leading to the underground workings. Our objective point being one of the stopes where a variety of copper minerals had been found, we went on through long drifts, up ladders well worn by rough shod feet,

sliding down holes, up through ore shutes into other levels, sliding on our backs 250 feet down an incline to other drifts again, until finally flickering lights and sounds, indicated the miners at work. One unaccustomed to such a maze of underground works could easily get lost, and I was not surprised on stepping from the cage at the surface, to find myself several hundred feet further up the gulch, and on the opposite side from the tunnel we first entered. We carefully looked over the face of the different ore bodies, and found in many places small cavities containing crystals, from which, after careful work with hammer and chisel, we took a variety of specimens. A number of them were groups of chalcopyrite crystals, some very brilliant, others tarnished quite black, and others still of a bright galena tint, with many curiously twinned. Groups of superb tetrahedrite crystals, with good sized perfect crystals of chalcocite on the same specimen, were found in the copper stope. Other attractive specimens were groups of small iridescent and very brilliant pyrite crystals, with diminutive, but pretty calcites scattered over them. Other cavities revealed small quartz crystals grouped among crystals of pyrite, galena and sphalerite. The best specimens of sceptre quartz are found in this mine, though fine ones are quite rare. An interesting and rare form of quartz has been found, with a third crystal extending from the termination of a sceptre crystal. A large proportion of these quartz crystals have a trihedral termination, while others show a quite regular taper to a sharp point. Pyrite shows all through the great ore bodies, and quite a variety of forms and interesting modifications are to be found. Perfect detached pentagonal dodecahedrons of good size are seen also in brilliant groups, as well as other similar forms, with rounded faces and rarer modifications. Groups of fine cubic crystals occur, some showing octahedral planes and corners modified by possibly a dozen faces, occasional crystals being as large as 2 or 3 inches. While the larger part of these pyrite specimens show the usual brass yellow color, a few fine groups are tarnished in beautiful iridescent blue, purple and steel tints, and still others among quartz crystals are quite black. Pyrite is also found in a greenish velvety coating on tetrahedrite, and other minerals. A few rare specimens are pieces of massive galena, covered on one side with crystals of tetrahedrite, which are partially covered with groups of iridescent pyrite crystals, octahedral in habit, and twinned in complex forms. Groups of galena crystals of cubic, octahedral,and curiously twinned forms were noted. Sphalerite in octahedral, tetrahedral and twinned crystals, of very perfect form, frequently occurs in cavities with quartz. Chalcocite crystals of good size and very perfect, occur sparingly with tetrahedrite crystals, and on pyrite crystals. I do not know of any other locality for crystals of this mineral on this side of the Rocky Mountains. Another rather rare mineral is goslarite, which is found rarely in some of the old drifts in very delicate white silky tufts hanging from the walls, and Mr. Holden has had a number of glass tubes carefully filled with the best of it. Several tons of a rare combination of galena and plumbago were taken out some time ago, but none is to be had at present. Long crystals of cerussite, in color and form resembling smoky quartz have been found, and lately, some crystals of anglesite of good size. A large group of tetrahedrite

from this mine shows tufts of native wire silver among the crystals. The tetrahedrite from this locality is the best I have seen in the West, and some crystals are as large as one inch across. The pyrite is also the best I have seen in this region, and some very showy and unique combinations are found. In one of the new drifts near the surface I noticed ordinary milky opal in considerable quantity. The beautiful iridescent pyrite groups, and other minerals with these very attractive tints, have heretofore been quite rare in this mine, only a comparatively small body of them having been discovered during the last month. While with considerable care, quite a number of fine specimens may be preserved at present, it is by no means certain that they will continue, and collectors would do well to get them while they are to be had. Mr. Holden says he intends to have the best specimens saved, and no doubt collectors who have good minerals to exchange, can obtain such as I have noted by addressing him at Salt Lake City.

MINERALOGY—OF WHAT USE IS IT.

By C. T. Morgan.

[Read before the Students' Mineralogical Club of Philadelphia, Feb. 4, 1896.]

I have *often* been asked, while poring over some rare specimen, "What *use* is it? What does it amount to, anyway?"

These questions I propose to answer briefly, and as explicitly as my limited knowledge and experience will permit.

Questions like the foregoing, it will be observed, are always asked in derision by those who know nothing of mineralogy, who care as little as they know, and, therefore, have no right to judge in the matter.

A little careful thought ought to suffice to convince the most incredulous that mineralogy has its uses, and very important ones, too. Yet, instead of adopting the more sensible course, they content themselves by railing at those who, with keener vision, are able to read between the lines.

The material world comprises two divisions, viz., the organic and the inorganic. The former is distinguished from the latter by the possession of various organs, each endowed with its own peculiar function, while presiding over, and controlling the whole, is that mysterious something, which we call life.

The inorganic kingdom, which embraces mineralogy, is the Alpha and Omega of all terrestrial life. From it, all organized beings originate; to it, they must return in obedience to the familiar laws of chemistry, when the power of life is withdrawn.

Who then can affect to sneer at that which is incorporated with their very existence, because they are ignorant of the relationship they sustain to the inanimate world? Or scoff at those, who, fired with noble enthusiasm, have toiled and suffered in the cause of truth, while they stand idly by, enjoying the ripe fruits of their labor?

Without the proper use of the minerals and metals, glass and iron in particular, man must have remained forever outside the pale of

civilization. Yet the highest degree of perfection to which the arts and sciences have been brought, could never have been attained without a thorough knowledge of mineralogy and metallurgy.

Quite recently chemistry has been brought forward as a very important industrial science. Many artificial products little thought of in our father's days have become household necessities; and the achievements of the past seem but an index for the future. Yet, it is chiefly through the mineral kingdom that we gain access to chemical investigations.

It must then be patent to all, that man is dependent upon the inorganic world, directly or indirectly, not only for his sustenance, but for much that contributes to his comfort, his happiness, and the development of all his faculties.

Again, mineralogy is the highway to Geology, Archæology, Biology, and other sciences which involve questions of tremendous interest and importance.

In this manner it has furnished more than one illustrious example. Shall we deprecate a science which has given the world such men as Warner, DeLisle, Hand Haüy, and more recently, a Miller, a Dana, or a Drummond? Men whose names shine brightest among the benefactors of mankind! Men whose characters have embellished and illuminated the field of science with a halo that shall grow brighter as the ages roll on!

The study of Mineralogy necessitates a habit of close observation and discrimination. As a disciplinary measure it is invaluable. I believe no one can come to the study of Nature without a keener appreciation of all that is pure and lovely, and an intenser longing for a higher, nobler plane of living.

It seems a strange oversight, and deeply to be deplored, that in these days, when education is being carried to such an extent in every other department, the beneficial effects of this branch are ignored by those who have the educational interests in charge. Yet with the discovery of new species, and with a better understanding of the laws and principles which govern this science, it seems to be developing new and increasing interest, and I trust the time is not far distant when the value of Mineralogy as an inductive science will be fully recognized and appreciated.

Drawing aside the curtain of my cabinet, I seem to look beyond, into the far distant and forgotten past. On these rocky pages, stamped in indelible characters, are the hieroglyphics of a life as wonderful as it is venerable. Design and adaptation are written on all.

As the long ages pass in review, freighted with terrific cataclysms of fire and flood, strange scenes of life and death, I can trace the fingermarks of an omnipotent Power, clearly pointing to creation's crowning act, *man*, sentient, regal, immortal man.

Personally, the study of mineralogy has been of inestimable value. It has ever proved an unfailing source of strength and healthful recreation. How often, when borne down with trouble and gloomy forebodings, have I been made to forget the foibles of earth, and my heart has been lightened and filled with rapturous delight, in the rich enjoyment of those pleasures which Nature alone can yield.

There is something interesting and unique in these way-worn

wanderers, that from all quarters of the globe, have sought to share my home.

As I gaze upon them, not irreverently, they seem to look down upon me with loving eyes. To me, they speak with more than human eloquence,

"The hand that made us is divine."

SILVER AND LEGEND IN MEXICO.

THINGS THAT ARE TOLD ABOUT A GRANDEE'S MINE AND ITS READY-MADE FORTUNE.

Mexico is rich in old silver mines and legends. Sometimes mining news gets mixed with the legends, and then there is trouble for the prospectors who are looking for good things. A Mexican grandee, Don Alcazar de Chilicoloro, is said to own a famous mine of inexhaustible riches in the State of Chihuahua. It contains silver ore of a high grade, and it is so rich, it is said that whenever the Don and his wife run short of money they simply direct the head peon to gather together his twelve or thirteen serfs and their equally patient and uncomplaining fellow serfs, the burros, and start the procession on the trail for the family mine.

A writer in the *Alaska Mining Record* says that this mine has been in the possession of the Don and his ancestors for the last three centuries. The mine is nothing but a rude tunnel in the mountain side. The entrance to the tunnel is barricaded with heavy timber doors, which are fastened with three old Spanish locks, the keys to which are always in the possession of the Don. When the mine is reached the Don unlocks the doors. He then directs his body servant to swing his hammock beneath the branches of a massive tree standing at the entrance to the mine, which was a well-grown sapling when the first Don of the family discovered the mine 300 years ago. The peons are set to work getting out the silver ore, which they put into the baskets slung on the backs of the burros. It is the work of but five or six hours to get out ore that will be worth several thousands of dollars. It is a free-milling ore and it is no trouble to work it. While the ore is taken out and loaded into baskets the Don is lying in his hammock, smoking cigarettes. When the baskets are full the Don pulls himself together long enough to lock up the mine and seal the entrances, and the cavalcade then starts back to Chihuahua, twelve miles away. As soon as it arrives there the Don sells the contents of the baskets, for which he receives from $12,000 to $18,000 in Mexican money. He gives his peons a liberal reward besides their wages. They divide it between the Church and pulque merchant, reserving a modicum to keep themselves and their families partly clothed and fed until the Don shall hold the next of his grand rallies, which occur four or five times a year. The Don owns a magnificent hacienda, and has a lovely wife and two beautiful daughters, who have all the pride of the true Castilians. The hacienda contains more than 6,000 acres, bordering one of the principal highways leading out of Chihuahua.

MINERAL PRODUCTION OF THE UNITED STATES IN 1894–95.

Compiled for THE MINERAL INDUSTRY, Vol. IV.,

By Richard P. Rothwell, editor of the *Engineering and Mining Journal*.

No.	Products.	Customary Measures.	1894. Quantity. Customary Measures.	1894. Quantity. Metric Tons.	1894. Value at Place of Production.	1895. Quantity. Customary Measures.	1895. Quantity. Metric Tons.	1895. Value at Place of Production.
	NON-METALLIC.							
	Abrasives—							
1	Corundum and emery	Short tons	1,120	1,106	$109,500	385	349	$56,400
2	Garnet	Short tons	1,000	907	35,000	2,065	1,873	93,350
3	Grindstones	Short tons	29,989	27,200	257,596	36,389	33,004	290,378
4	Millstones	Short tons	297	269	4,447	105	95	8,525
5	Tripoli and infus. earth	Short tons	1,663	1,508	22,825	1,788	1,622	26,049
6	Whetstones	Short tons	1,735	1,574	84,450	1,609	1,459	78,303
7	Alum	Short tons	72,000	65,304	2,160,000	75,000	68,025	2,225,000
8	Antimony ore	Short tons	165	150	9,075	1,083	982	37,905
	Asbestos and talc—							
9	Asbestos	Short tons	265	240	4,350	1,010	916	11,400
10	Fibrous talc	Short tons	50,500	45,804	505,000	66,500	60,316	665,000
11	Talc and soapstone	Short tons	21,044	19,087	401,892	18,885	17,129	361,353
12	Asphalt	Short tons	4,198	4,080	75,654	14,300	12,970	300,000
13	Bituminous rock	Short tons	34,199	31,018	148,120	43,778	39,707	143,456
14	Barytes	Short tons	23,758	21,548	95,032	20,255	18,371	99,020
15	Bauxite	Long tons	10,732	10,908	42,928	14,145	14,371	56,580
16	Borax	Pounds	13,140,584	5,962	919,841	13,506,356	6,126	742,850
17	Bromine	Pounds	379,444	172	98,655	394,854	179	102,662
18	Cement, natural hydraulic	Bbls., 300 lbs.	7,813,766	1,064,297	4,455,928	7,694,053	1,047,006	4,597,285
19	Cement, Portland	Bbls., 400 lbs.	611,229	110,877	1,209,446	749,059	135,879	1,430,089
20	Clay, refractory	Short tons	3,375,738	3,061,794	4,050,885	*b*3,750,000	3,401,250	4,500,000
21	Clay, kaolin	Short tons	24,552	22,246	185,169	30,910	28,035	258,431
22	Coal, anthracite	Short tons	*a*52,010,433	47,183,345	80,879,404	*a*58,362,985	52,965,538	89,948,699
23	Coal, bituminous	Short tons	*a*117,865,348	106,903,871	103,758,967	*a*138,079,466	125,247,053	125,489,488
24	Coke	Short tons	8,495,205	7,706,846	12,654,558	9,927,348	9,006,090	15,258,935
25	Cobalt oxide	Pounds	6,550	3	8,843	6,400	3	8,640
26	Copperas	Short tons	14,897	13,511	104,160	14,118	12,805	69,846
27	Copper sulphate	Pounds	*b*60,000,000	27,215	2,016,000	45,000,000	20,412	1,350,000
28	Chrome ore	Long tons	2,653	2,697	35,125	.....	.....	.....
29	Feldspar	Long tons	18,704	19,003	83,465	22,195	22,550	104,082
30	Fluorspar	Short tons	6,400	5,805	58,304	4,000	3,628	36,440
31	Graphite	Pounds	770,846	349	34,689	392,008	178	17,640
32	Graphite, amorphous	Short tons	165	150	1,252	1,100	998	4,700
33	Gypsum	Short tons	301,536	273,498	910,831	298,572	270,804	974,219
34	Iron ore	Long tons	11,880,000	12,070,080	20,790,000	16,950,000	17,221,200	29,662,500
35	Lime	Bbls., 200 lbs.	*b*56,750,000	5,148,320	28,375,000	*b*60,000,000	5,443,164	30,000,000
36	Magnesite	Short tons	1,370	1,243	7,864	2,200	1,995	14,700
37	Manganese ore	Long tons	11,735	11,924	74,890	14,883	15,121	92,044
38	Mica, ground	Pounds	829,500	377	35,957	750,000	340	31,956
39	Mica, sheet	Pounds	9,900	4	11,103	6,200	3	6,400
40	Mineral wool	Pounds	5,776	5,239	58,936	6,742	6,115	69,481
41	Monazite	Pounds	750,000	340	45,000	1,900,000	862	114,000
42	Natural gas	.....	.....	.....	13,000,000	.....	.....	12,000,000
43	Paints, mineral	Short tons	47,593	43,167	1,011,182	47,084	42,705	1,086,767
44	Paints, vermilion	Short tons	91	83	111,209	118	107	118,190
45	Paints, white lead	Short tons	87,242	78,155	8,445,174	92,000	83,462	8,740,000
46	Paints, zinc oxide	Short tons	22,814	20,697	1,711,275	22,690	20,498	1,588,300
47	Petroleum (crude)	Bbls., 42 gals.	48,527,336	6,158,119	40,762,962	50,652,025	6,420,742	42,547,701
48	Phosphate rock	Long tons	952,155	967,485	2,856,465	831,498	844,802	2,577,643
49	Marls	Long tons	225,000	228,622	607,500	217,700	221,183	587,790
50	Precious stones	.....	.....	.....	150,000	.....	.....	150,000
51	Pyrites	Long tons	107,462	109,192	466,466	81,000	82,296	353,560
52	Salt, evaporated	Bbls., 280 lbs.	11,798,659	1,498,193	5,586,326	12,521,498	1,539,178	5,844,348
53	Salt, rock	Bbls., 280 lbs.	2,341,922	297,376	784,063	1,367,638	173,662	518,740
54	Silica, sand and quartz	Long tons	477,670	485,313	418,612	523,640	532,018	553,128
55	Slate, roofing	Squares	611,776	180,474	2,007,321	645,361	190,277	2,062,239
56	Slate, other manufactures	Square feet	4,395,125	12,966	399,758	3,786,599	11,170	369,062
57	Stone, limestone (flux)	Long tons	3,544,398	3,601,459	2,126,636	3,390,000	3,444,240	2,542,500
58	Stone, marble	Cubic feet	6,331,279	518,532	3,576,853	6,942,533	568,593	4,086,261
59	Stone, onyx	Cubic feet	1,450	110	29,000	800	66	10,750
60	Sulphur	Long tons	441	488	7,056	12,000	12,192	192,000
61	Other building stones	.....	.....	.....	*b*30,000,000	.....	.....	33,000,000
	Total non-metals	.....	.....	.....	378,877,939	.....	.....	428,266,385
	METALS.							
62	Aluminum	Pounds	817,600	371	490,560	900,000	408	495,000
63	Antimony	Short tons	220	205	39,200	433	393	68,847
64	Copper	Pounds	353,504,314	160,392	33,540,489	386,453,850	175,294	36,944,988
65	Gold	Troy ounces	1,923,619	*c*59,824	39,761,205	2,265,612	*c*70,470	46,830,200
66	Iron, pig	Long tons	6,657,388	6,764,572	71,966,364	9,446,308	9,597,449	108,632,542
67	Lead, value at New York	Short tons	160,867	145,906	10,585,048	156,854	142,298	10,132,768
68	Quicksilver	Flasks, 76½ lbs	30,440	1,056	1,095,840	33,978	1,179	1,313,589
69	Silver, commercial value	Troy ounces	49,846,875	*c*1,550,387	31,403,531	46,331,235	*c*1,441,087	30,254,296
70	Zinc spelter	Short tons	74,004	67,135	5,209,882	81,858	74,245	5,942,890
	Total metals	.....	.....	.....	194,092,119	.....	.....	240,615,120
	Est. products unspecified	.....	.....	.....	5,500,000	.....	.....	5,000,000
	Grand total	.....	.....	.....	578,470,058	.....	.....	673,881,505

(*a*) Bituminous coal includes brown coal and lignite. The anthracite production is the total for Pennsylvania, Arkansas, and Colorado. (*b*) Estimated. (*c*) Kilograms.

MANUFACTURE OF ASBESTOS.

Pearson's Weekly of London has the following account of the methods used in preparing asbestos for its various uses; If any readers have ever made the acquaintance of asbestos at all it has no doubt been in the shape of backing to a gas stove or a fire brick. Very few people outside the trade know what enormous quantities are utilized where machinery is used. The business done in domestic asbestos is a mere bagatelle compared with that got through in packing for steam boilers and engine pistons.

Asbestos in its original state is a fibrous mineral indigenous to Canada and other places, and is sent over here in lumps like pieces of raw slate on the top or bottom, while the sides are covered with a fluffy substance—the fiber when it is pulled from the bulk. You can pick each lump to pieces with your nails, although to look at it one would think that nothing less than a heavy hammer would make an impression on it. When it reaches the factory it is put into crushers. These are like the ordinary mortar mixers that you see where building operations are going on, and the resulting gritty, fluffy mass is thrown into what is termed a devil. The devil tears it up with sharp prongs and then sifts the grit from the fluff. The former is used for mixing with the asbestos in other processes, while the latter is shot into a receptacle that reduces it to a consistency almost as fine as cotton wool. As it falls from this machine it looks for all the world like snow.

In other departments the raw asbestos is crushed and then mixed with certain earths to be crushed for covering the outer surfaces of steam boilers, asbestos being a non-conductor of heat. Then again large quantities of mill board are made for packing between fire proof doors and articles of that description, while occasionally it goes to form one of the main constituents in a fire proof theatre curtain.

SOMETHING QUEER IN PEARLS.

THE most freakish freak ever assumed by pearls is exhibited in that extraordinary curiosity known to the gem fanciers as the "Southern Cross." Taken as a whole, it is a group of nine pearls grown together in such a manner as to form a perfect Latin cross. Seven of the nine go to form the upright of the cross, or main shaft, which is exactly one and one-half inches in length. The arms of the cross, which, it must be admitted, are hardly long enough to give the figure good proportions, are each formed by one pearl so arranged on each side that the addition of the tenth of an inch to each would give perfect symmetry to the outline of the whole figure. There is not an ill-shaped or off-colored pearl in the group, and, taken as a whole it is not only a remarkable freak of nature, but it is also a valuable collection of gems of goodly size and fine luster.

This wonderful freak was discovered several years ago in the pearl fishing grounds of western Australia by a man named Clark. He is said to have been a very superstitious man, and to have regarded the symbol exhibited in his find as an ill omen. On this account he dug

a hole, and, after carefully wrapping the oddity in several folds of silk, buried it. About twenty-one years ago, in 1874, the gem was disinterred, and since that time has changed hands several times. The last time it sold for $52,000.

CHONDRODITE ON NEW YORK ISLAND.

By Arthur M. Edwards, M.D.

In the fall of 1895, as I was wandering along the Hudson River, where they are making a new road, known as the Speedway, in search of minerals, and especially monazite, I came to a place where they were cutting a street through the crystallized limestone, which I noticed was of good quality, some of it being almost as clear as Iceland spar. Examining the rock closely I found it was full of nicely semi-crystallized chondrodite. I do not know of this mineral being recorded on New York Island and therefore record it here.

It is at 208th Street and the southeast corner of Kingsbridge Road. There is plenty of the mineral and I hope that the collectors of this vicinity find it and get a good supply.

Chondrodite is most likely a volcanic mineral. That is to say it was formed during volcanic action, and it is recorded by Dana, at Brewster, N. Y., and Sparta, N. J., altered into serpentine. It is a silicate of iron and magnesium, with fluorine, and is orthorhombic, cleavage indistinct. It is usually, as on New York Island, in imbedded grains or masses of a somewhat granular texture. The lustre is vitreous to resinous. Color white yellow, pale yellow, or brown (New York Island); sometimes red, apple-green, when the iron is not peroxidized, black or gray. Transparent to subtranslucent, fracture subconchoidal or uneven. The variety called humite is from Vesuvius. The name is from the Greek for a grain, alluding to the granular structure. It may be of importance to note that I saw on the rocks on the Hudson River side of the island the glacial striæ very distinct and pointed to the N. W. and S. E., showing that the ice came down from that direction, N. W.

With infinite labor and care, and much expense, the Scientific Publishing Co. of New York City has collected, much earlier than usual, the complete statistics of the mineral and metal productions of the United States in 1895, and we give on another page a table from that valuable work. These statistics have been collected for the fourth annual volume of "The Mineral Industry: Its Statistics, Technology, and Trade," which will shortly appear, and they are the most comprehensive and accurate statistics of our mineral production ever yet published; they alone are used by the British, French, and some other European governments in their official publications. The mineral and metal production of the United States in 1895 was the largest in the history of this or any other country, and is an exhibit worthy of the attention of economists and law makers. The economic details published in "The Mineral Industry" volume show that the United States is rapidly attaining the point where it will be the greatest exporter of minerals and metals of all the commercial nations.

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A MONTHLY MAGAZINE.

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PROPRIETOR & EDITOR:
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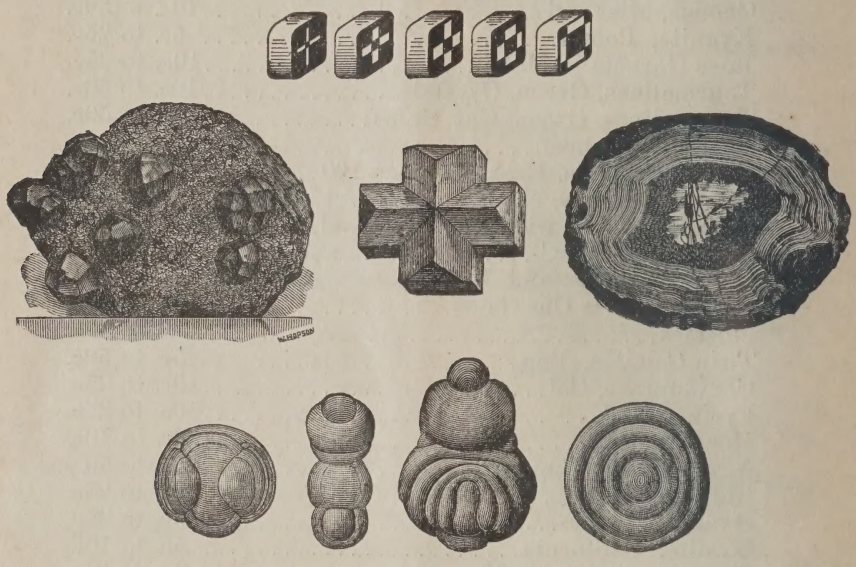

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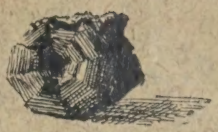

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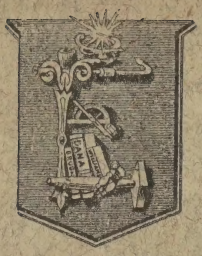

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